

# FLOW-i

Anesthesia delivery system

**MAQUET**  
GETINGE GROUP



Performance Redefined

Ventilation excellence  
Patient safety  
Low flow anesthesia





# Anesthesia system with built-in **SERVO ventilator**

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MAQUET FLOW-i® is a product of Maquet's leadership in OR and ICU medical technology development. Maquet has been setting mechanical ventilation standards for more than 40 years with the high performance SERVO platform.

Based on the core technology of the SERVO ventilator series, FLOW-i is designed to handle the anesthesiologist's common challenges. This is made possible because of the successful combination of the SERVO controlled gas modules with the unique MAQUET VOLUME REFLECTOR®.

**From neonates to the morbidly obese** – patients can benefit with FLOW-i, from excellent quality ventilation during anesthetic care, enabling the highest performance when they need it most.

Maquet | The Gold Standard

## Performance Redefined

- precise
- fast
- efficient

and intelligent...  
like a hummingbird!



Innovation leaders

# 40 years

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Maquet started producing  
ventilators in 1971

# Volume Reflector technology

## – a smart re-breathing device

### Designed to provide safe and uninterrupted ventilation

FLOW-i takes advantage of a Maquet innovation called the Volume Reflector. The Volume Reflector is a re-breathing device that allows partial re-breathing of exhaled gases. In low fresh gas flow settings and in the case of leaks, the circuit will never be empty – ensuring ventilation will remain uninterrupted regardless of surgical constraints, changing conditions or patient position.

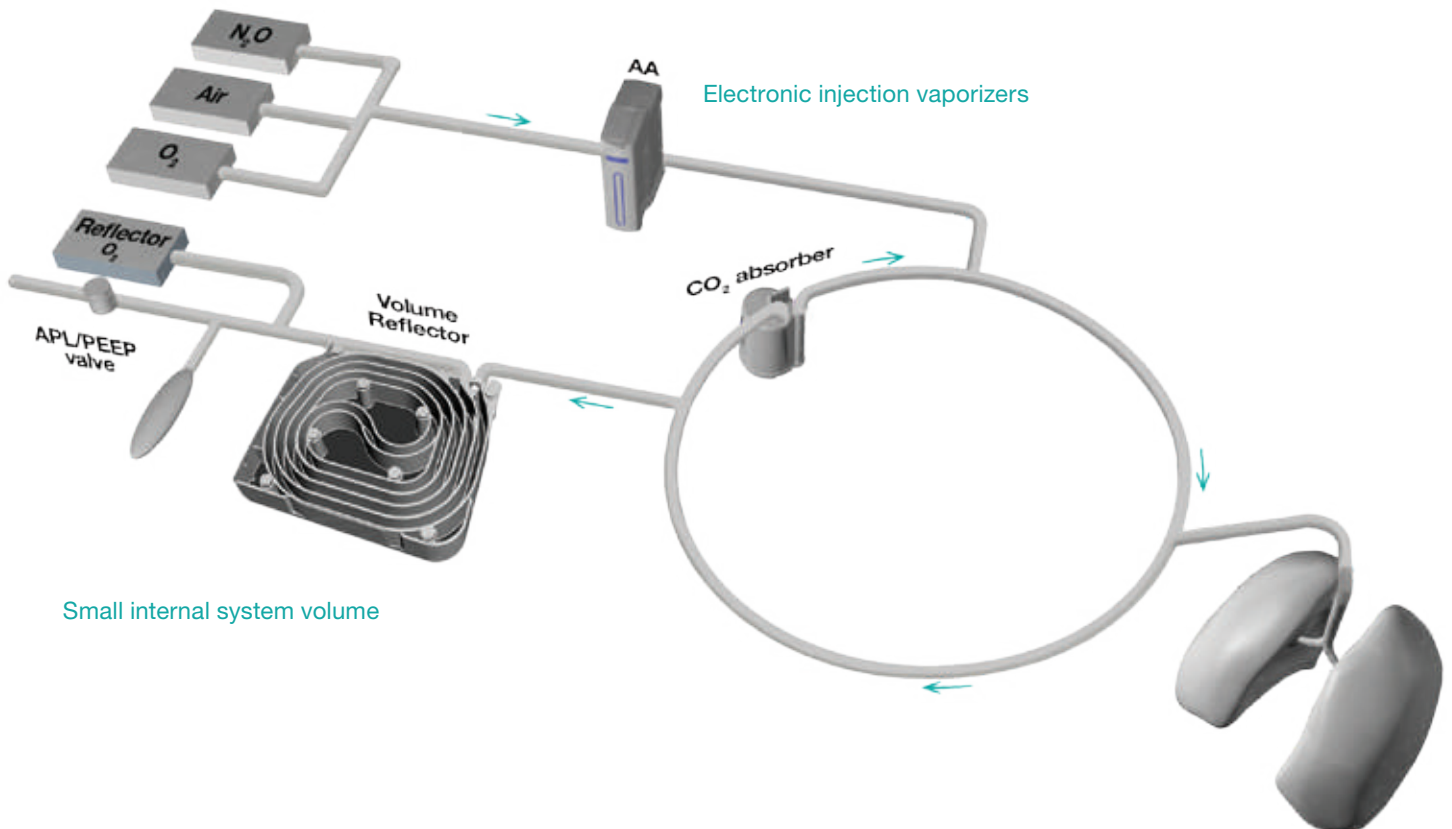
### Minimized risk of hypoxia

The Volume Reflector is oxygen-driven by design. If there are leaks, the circuit is saturated with oxygen, minimizing the risk of a potentially dangerous hypoxic mixture.

### Fast wash-in and wash-out

FLOW-i's small system volume allows for fast wash-in and wash-out, providing better control of the anesthesia.

Using same gas modules  
as the SERVO ventilators



Small internal system volume

*The FLOW-i re-breathing system is optimized with a Volume Reflector, which, together with the SERVO controlled gas modules, enables better ventilation performance compared to traditional bag-in-bottle, turbine and piston-operated systems.*

# ICU **ventilation performance** when you need it

Extensive ventilatory power capabilities are essential to optimal anesthesia care. They help prevent complications and avoid interventions, especially for patients suffering from underlying illnesses and complicating factors.

## Precise ventilation, even in patients with high airway resistance and low pulmonary compliance

The Volume Reflector technology and the gas modules accurately deliver tidal volumes down to 5 ml. The rigidity of the Volume Reflector and patient cassette prevents erratic changes in volumes and pressures ensuring accurate delivery of small tidal volumes.

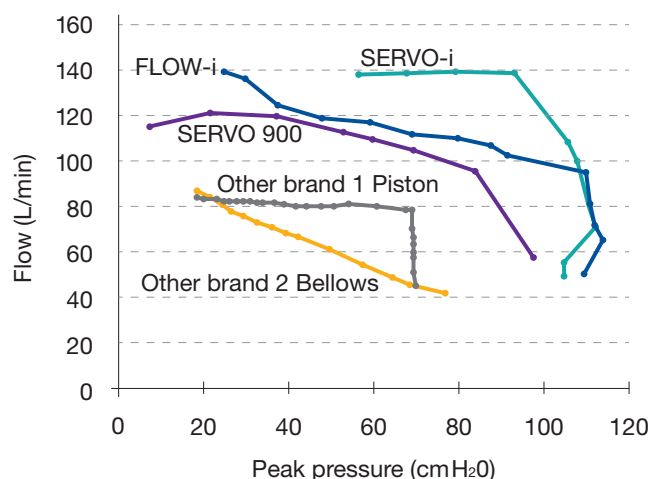


Figure 1. FLOW-i can deliver the set tidal volume even when there is high abdominal and thoracic pressure, thus avoiding hypoventilation. Data from bench testing, data on file.

## Patient case report confirms FLOW-i's high ventilator performance

In Graz, Austria, a premature infant weighing only 393 g was successfully anesthetized and ventilated with a FLOW-i. Even in extreme conditions, FLOW-i can deliver similar tidal volumes as an ICU ventilator.\*

The table shows comparative data from The University Hospital Graz, Austria, where FLOW-i ventilated the 393 g neonate.<sup>1</sup>

(PIP: peak inspiratory pressure; PEEP: positive and end-expiratory pressure; MV: minute volume; RR: respiratory rate; TV: tidal volume).

Measured values (pressure control mode)	Intensive care respirator (preoperative)	FLOW-i (intraoperative)
PIP (mbar)	22	14
PEEP (mbar)	4	5
MV (l/min)	0.08	0.07
RR (l/min)	28	24
TV (ml)	2.9	3



\*Visit [www.criticalcarenews.com/anesthesia](http://www.criticalcarenews.com/anesthesia), a peer-to-peer forum for anesthesia and intensive care clinicians throughout the world sharing experiences with each other, and read the full case report.

# Focus on **patient safety**

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## Unique O<sub>2</sub>GUARD helps reduce risk of hypoxia

The unique O<sub>2</sub>GUARD™ function automatically increases the fresh gas and oxygen if measured FiO<sub>2</sub> is lower than 21%. O<sub>2</sub>GUARD provides added peace of mind in reducing the risk for hypoxia and this feature is standard in all FLOW-i anesthesia machines. <sup>2, 3</sup>

## Predicted Body Weight (PBW) to support lung protective ventilation

FLOW-i supports your ability to identify the patient's needs and to act accordingly. It makes clinically documented values, such as VT/PBW and a recommendation of TV and RR based on Dr. Devine's formula, available on screen and easily trended.

“The only commercially available active inspired hypoxic guard is the FLOW-i's O<sub>2</sub>GUARD”

– Dr. Jan Hendrickx, Aalst, Belgium



When patient details (age, weight, height and gender) have been filled in, PBW and the suggested ventilator parameters will be presented on the screen.

# Improved **economic efficiency**

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## Cost savings with anesthetic agent efficiency

The innovative FLOW-i system can deliver outstanding anesthetic agent efficiency to benefit economy and the environment.

**The agent usage efficiency is based on FLOW-i's unique design with:**

- Injection vaporizers
- Fresh gas mainly delivered during inspiratory phase
- Fresh gas flow limited to minute volume
- The Volume Reflector which:
  - acts as a reservoir for exhaled gases
  - has the ability to re-breathe up to 95% of the exhaled gases
- Small system volume which allows for fast wash-in / wash-out
- Efficient gas modules



“Agent consumption with FLOW-i is significantly lower than with conventional anesthesia machines”

– Dr. Suzanne Thomson, Glasgow, UK







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# Low flow anesthesia

## Automatic Gas Control (AGC)

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### With safety in focus

Automatic Gas Control (AGC™) is designed to reach the target end-tidal anesthetic agent you set, at the **speed** desired. Whether the time target is 3 or 15 minutes. This helps adapt administration of agent to the patient's status or surgical incision time, and reduces the risk of under- and overdosing. The risk of hypoxia is also reduced as AGC will reach the **Target FiO<sub>2</sub>** as quickly as possible independent of the speed setting.

### Convenient

AGC can be prepared during standby or manual ventilation. All you need to do once the airway is secured, is to switch to AGC and adjust speed and **end-tidal anesthetic agent** (EtAA) concentration accordingly. AGC automatically adjusts fresh gas delivery, giving you more time to focus on other responsibilities during the most intense phases of your work. Meanwhile the **prediction tool** clearly visualizes trends and time to target.

### Cost effective

Once the end-tidal target is reached, AGC automatically reduces the fresh gas flow and agent delivery to minimal levels<sup>4</sup>. Enabling safe **low flow anesthesia**. By using less anesthetic agent, MAQUET FLOW-i reduces the well-known negative environmental impact of inhalational anesthesia<sup>5</sup>. At the same time, you can benefit from cost savings and an improved workflow.

“After securing the airway, a single twist of the knob has you cruising in low flow mode. Low flow anesthesia cannot be made any easier”

– Anesthetic Clinician

# Low flow anesthesia

## Automatic Gas Control (AGC)

### Speed and prediction

AGC features a unique EtAA speed control and prediction tool which is displayed directly on screen in real-time. Users can now determine time to end-tidal target, thus allowing more efficient gas delivery.

#### You can benefit from:

- Improved estimation, forecast and control of anesthetic agent during induction and emergence of anesthesia
- Automatic titration of anesthetic agent administration (including speed) according to the patient's physiological status<sup>6</sup> or surgical incision time
- Facilitating the work flow by optimizing the end of anesthesia in line with operating room (OR) timings and the forward planning for the next cases

### Control target FiO<sub>2</sub>

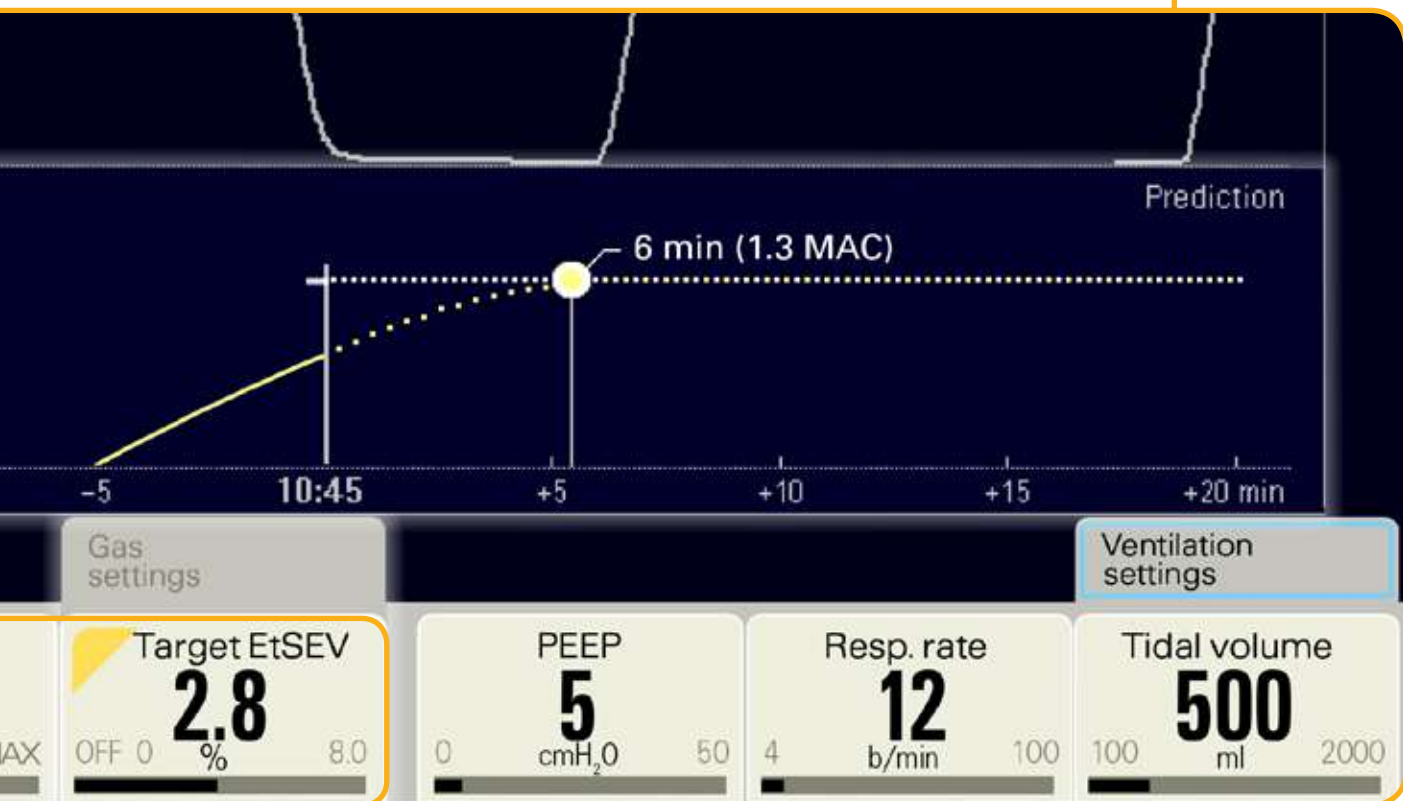
AGC facilitates the control of oxygen delivery in all anesthesia situations by a single FiO<sub>2</sub> target setting. This FiO<sub>2</sub> target setting has priority and is unaffected by anesthetic agent speed selection, reducing the risk of hypoxia.

*The AGC settings are always available allowing quick and easy access.*



## Control target EtAA

AGC automatically controls the fresh gas flow (FGF) and anesthetic agent supply in order to reach the end-tidal anesthetic agent (EtAA) target for the desired time. This removes the need for continuous manual adjustments of FGF, O<sub>2</sub> and anesthetic agent, giving you more time for other tasks.





# Ease of use and **smart by design**

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The FLOW-i system is easy to understand and use thanks to its intuitive touch interface. Even in the most challenging operating environments.

Staff can adapt the system according to their needs in the operating room via:

- Unique adjustable height function
- Vertical shafts and horizontal rails for the mounting of accessories
- Rotatable arm and tiltable screen

The lightweight electronic injection vaporizers are placed centrally on the FLOW-i. Switching between agents is performed by a touch on the intuitive display.

The vaporizers can be refilled while still slotted in the machine and with one still in use. They are checked during the recommended daily system checkout and do not need any yearly calibration. The Desflurane vaporizer doesn't need to be heated before use.



**Advanced hemodynamic monitoring\***

PulsioFlex® monitor with PICCO® and ProAQT® technology

**Intuitive 15" tiltable touch screen**

Ease of use

**Rotatable arm**

Ease of use and flexibility

**Volume Reflector**

Ventilation performance

**CO<sub>2</sub> absorber**

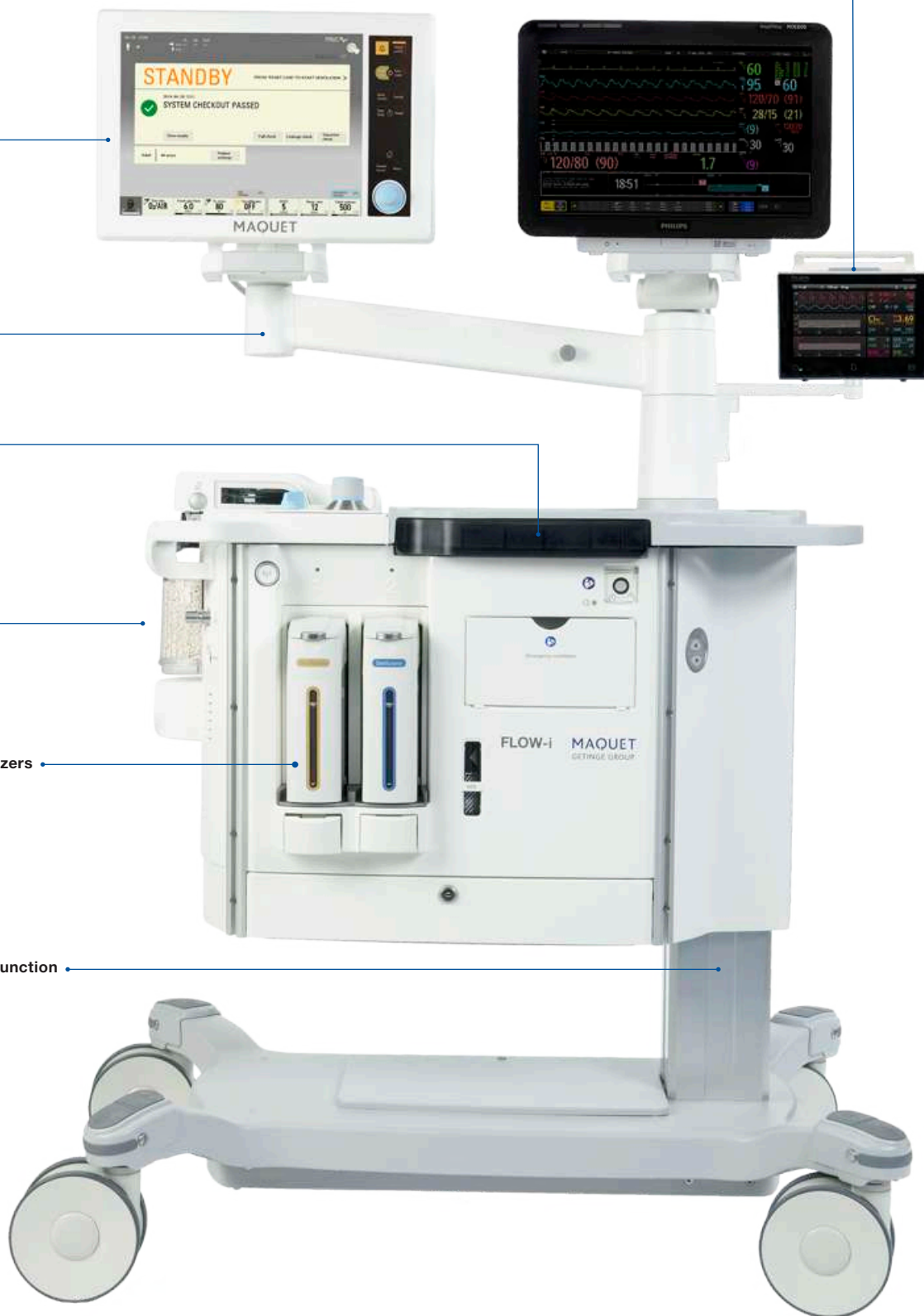
Reusable / disposable

**Electronic injection vaporizers**

Cost effectiveness

**Unique adjustable height function**

Ease of use and flexibility



\* The extension arm holding the PulsioFlex monitor has not been tested and verified.

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# Building on a **legacy of performance**

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One of the great advantages of FLOW-i is its modular platform approach and the flexibility it offers in addressing both current and future potential needs.

## **Freedom**

With FLOW-i, there are options for configuring the system to your exact needs without being tied to a single supplier. For instance, FLOW-i can be fitted with many different patient monitors currently available on the market, a flexibility that also gives you the option of re-using your existing monitors.

## **Connectivity**

FLOW-i is an electronic anesthesia delivery system with full data transfer capabilities. The unit's robust communication platform seamlessly interfaces all FLOW-i parameters with patient monitors, PDMS and HIS, enabling the transfer of essential clinical information.

## **Future-proof**

Maquet is applying the same development principles to FLOW-i as we have always to SERVO ventilators. The system's flexible design ensures that the unit can be upgraded and adapted when new FLOW-i functions become available or when clinical needs change. This protects your investment and enables staff to remain familiar and effective with the same platform today and into the future.



FLOW-i C40



FLOW-i C30



FLOW-i C20



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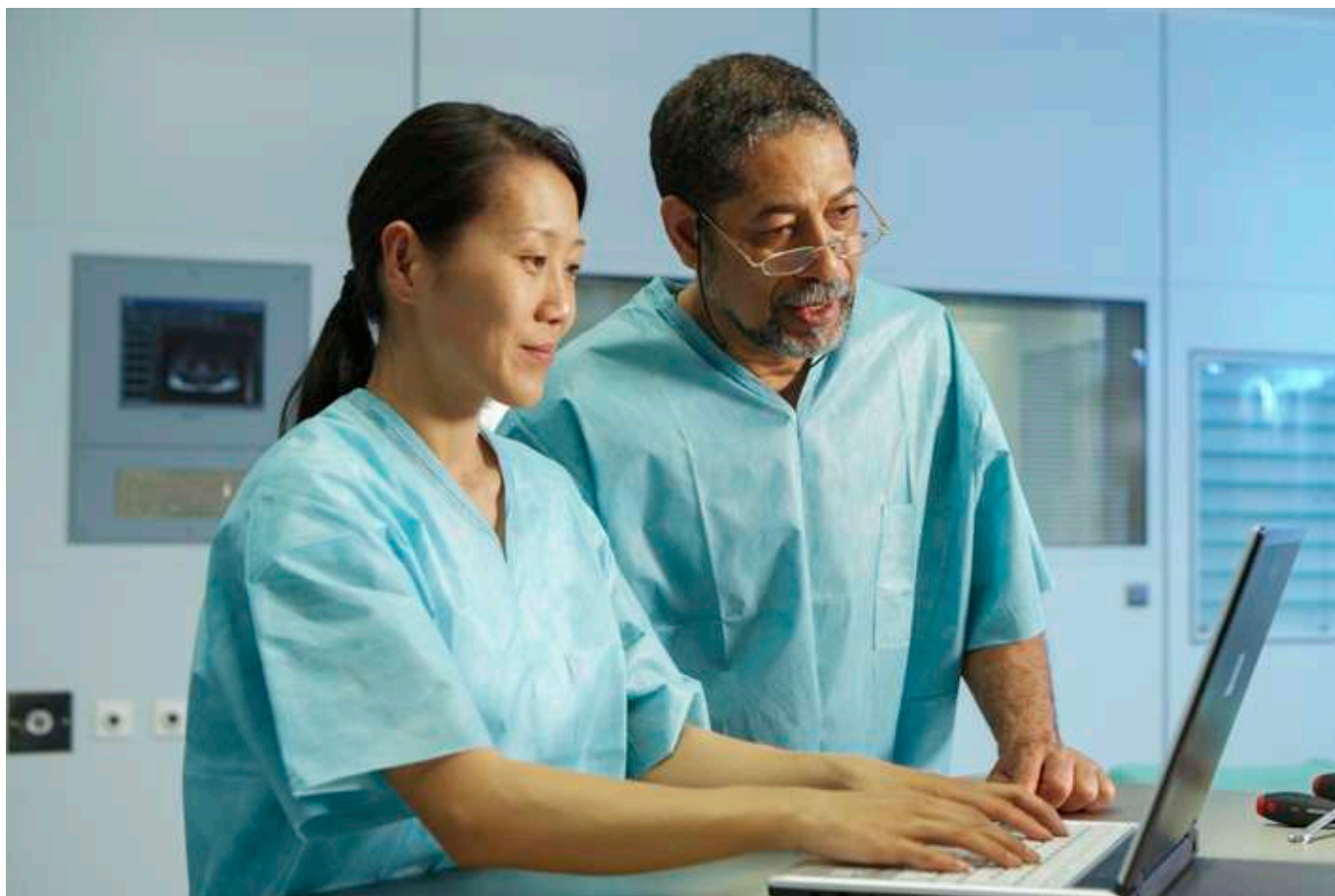
# Protecting your investment with MAQUET MCare

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MCare is a scalable service program that can:

- Help control operational and administration costs
- Maximize your up-time with help of remote service, which also includes proactive actions
- Ensure top quality Maquet parts and consumables are always available
- Make life easier in many ways for FLOW-i owners

An MCare maintenance contract adapted to your organization's needs, for instance, can give you an overview of short and long-term maintenance expenses that help plan your budgets more effectively. It also assures you ongoing access to the Maquet team and resources, making value-added expertise available to your team whenever you need it.





## References

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The product FLOW-i may be pending regulatory approvals to be marketed in your country. Contact your Maquet representative for more information.

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